United Nations

Framework Convention on Climate Change

FCCC/TP/2014/2

Distr.: General
23 April 2014

English only

Options for possible additional land use, land-use change and forestry activities and alternative approaches to addressing the risk of non-permanence under the clean development mechanism

Technical paper

Summary

This technical paper explores options for additional land use, land-use change and forestry (LULUCF) activities and alternative approaches to addressing the risk of non-permanence in LULUCF project activities under the clean development mechanism (CDM). The paper is based on the views submitted by Parties and observer organizations. The Subsidiary Body for Scientific and Technological Advice may wish to take note of the information contained in this technical paper when considering possible additional LULUCF activities and alternative approaches to addressing the risk of non-permanence in LULUCF project activities under the CDM.

GE.14-60709

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I. Introduction

A. Mandate

1. The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), by decision 2/CMP.7, requested the Subsidiary Body for Scientific and Technological Advice (SBSTA) to initiate work programmes to consider and, as appropriate, develop and recommend modalities and procedures for possible additional land use, land-use change and forestry (LULUCF) activities under the clean development mechanism (CDM) (para. 6), and for alternative approaches to addressing the risk of non-permanence under the CDM (para. 7).

2. SBSTA 36 initiated its consideration of those issues and invited Parties and admitted observer organizations to submit their views thereon.[1] SBSTA 37 took note of those views and encouraged the submission of further views.[2] SBSTA 38 invited Parties and admitted observer organizations to submit views on specific possible additional LULUCF activities under the CDM and specific alternative approaches to addressing the risk of non-permanence in LULUCF activities under the CDM, to be considered at SBSTA 39.[3]

3. SBSTA 39 requested the secretariat to prepare a technical paper exploring options for possible additional LULUCF activities and alternative approaches to addressing the risk of non-permanence in LULUCF activities under the CDM. SBSTA 39 requested that the technical paper be based on the views submitted by Parties and admitted observer organizations in response to the invitations contained in documents FCCC/SBSTA/2013/3, paragraph 143, and FCCC/SBSTA/2012/2, paragraphs 116 and 117, and that it explore the implications of the options for validation, monitoring and verification of CDM project activities.[4]

B. Scope of the paper

4. This technical paper explores:

(a) Options for possible additional LULUCF activities and their implications for the validation, monitoring and verification under the CDM (see chapter II below);

(b) Options for alternative approaches to addressing the risk of non-permanence in LULUCF activities and their implications for the validation, monitoring and verification under the CDM (see chapter III below).

5. The options explored are based on the views submitted by Parties and admitted observer organizations in response to the invitations by the SBSTA referred to in paragraph 3 above.

[1] FCCC/SBSTA/2012/2, paragraphs 116 and 117.
[2] FCCC/SBSTA/2012/5, paragraph 111.
[3] FCCC/SBSTA/2013/3, paragraph 143.
[4] FCCC/SBSTA/2013/5, paragraph 107.

II. Options for possible additional land use, land-use change and forestry activities

A. Summary of the views submitted by Parties and admitted observer organizations on possible additional land use, land-use change and forestry activities under the clean development mechanism

1. Submissions received

6. Seventeen submissions were received from Parties and groups of Parties on the issue of possible additional LULUCF activities under the CDM. These submissions are available on the UNFCCC website.[5] Four submissions, also available on the UNFCCC website,[6] were received from intergovernmental organizations (IGOs) and non-governmental organizations (NGOs).

7. In their submissions, three groups of Parties and six Parties recognized the need for and the importance of including additional LULUCF activities under the CDM. One group of Parties and three Parties expressed the view that they are open to discussions on possible additional LULUCF activities under the CDM. Another group of Parties stated that they are not seeking expansion of the LULUCF project activities under the CDM but are willing to leave the discussion open so that other Parties can submit concrete proposals.

8. One IGO and one NGO recognized the need for and the importance of including additional LULUCF activities under the CDM. In their joint submission, three other NGOs expressed the view that they are not in favour of expanding LULUCF activities under the CDM.

2. Views expressed by Parties on the need for possible additional land use, land-use change and forestry activities

9. Two groups of Parties and several Parties expressed the view that the land sector is very significant for climate change mitigation and sustainable development and that the CDM as a flexible mechanism holds a lot of potential for incentivizing mitigation action in the land sector in developing countries. They noted that so far, afforestation and reforestation activities have been the only eligible LULUCF activities under the CDM, thus limiting the contribution of the land sector to climate change mitigation. In their view, inclusion of additional LULUCF activities under the CDM could create opportunities for new mitigation projects in the relevant land-use categories.

10. A number of Parties emphasized that additional LULUCF activities under the CDM could play an important part in promoting sustainable development in Parties not included in Annex I to the Convention. In addition to their climate mitigation benefits, these activities could potentially prove valuable for soil conservation, water resource management, biodiversity conservation, combating desertification and restoration of ecological processes, and could provide food security, employment and livelihoods to vulnerable populations.

11. One group of Parties and some of the Parties noted that there has been significant scientific and methodological progress in the quantification of greenhouse gas (GHG) mitigation from different types of activities in the LULUCF sector. In their view, the methodological progress made in connection with regulated and voluntary carbon offset

[5] <http://unfccc.int/5901.php> and <http://unfccc.int/8017.php>.
[6] <http://unfccc.int/7482.php> and <http://unfccc.int/3714.php>.

schemes has demonstrated the possibility of successful implementation of different types of LULUCF activities in a number of developing country contexts.

12. Another group of Parties expressed the view that the information on possible additional LULUCF activities provided by Parties so far is not detailed enough to assess the implications of the possible inclusion of those additional activities under the CDM. They also noted that it is important to recognize that there is a significant gap in mitigation objectives and that, consequently, the international carbon market is negatively impacted by problems related to the imbalance between demand and supply.

13. One IGO and one NGO shared the views of Parties summarized in paragraphs 9 and 10 above.

14. In their joint submission, three other NGOs expressed the view that, given the limited mitigation potential of land-based carbon sequestration and the danger of reversals, expanding LULUCF activities under the CDM is unnecessary.

3. Suggested possible additional land use, land-use change and forestry activities

15. One group of Parties and some of the Parties suggested that the LULUCF activities eligible under Article 3, paragraph 4, of the Kyoto Protocol, namely forest management, revegetation, cropland management, grazing land management, and wetland drainage and rewetting, should be assessed as potential additional LULUCF activities under the CDM.

16. Three groups of Parties and several Parties suggested specific possible additional LULUCF activities, most of which correspond to the activities under Article 3, paragraph 4, of the Kyoto Protocol: forest management, cropland management, agroforestry, silvipastoral systems, revegetation, and wetland drainage and rewetting.

17. One IGO suggested crop production, silvipastoral and rangeland management, wetland drainage and rewetting, and revegetation as possible additional LULUCF activities. One NGO suggested avoided drainage and rewetting of peatland as a possible additional LULUCF activity.

4. Views on requirements for possible additional land use, land-use change and forestry project activities

Views relating to general requirements

18. A number of Parties suggested that the requirements for possible additional LULUCF activities under the CDM should:

(a) Demonstrate flexibility by taking into account the host country capacity for the measurement of GHG removals and the associated transaction costs;

(b) Be supported by robust modalities and procedures that address leakage, non-permanence and additionality;

(c) Be simple, cost-effective and respect national circumstances.

19. A group of Parties suggested that possible additional LULUCF activities should:

(a) Result in real, measurable and long-term climate change mitigation benefits;

(b) Have coherence with the political framework for REDD-plus[7] and a guaranteed ability to integrate into this framework;

[7] Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.

(c) Apply principles comparable to those referred to in decision 1/CP.16, appendix I, paragraph 2;

(d) Guarantee contribution to sustainable development and avoidance of perverse incentives.

Views relating to the application of existing modalities and procedures for afforestation and reforestation project activities

20. One group of Parties expressed the view that, before they are applied to possible additional LULUCF activities, the current modalities and procedures for afforestation and reforestation project activities under the CDM[8] should be simplified. In their view, the rules for the eligibility of land[9] and the small-scale project threshold of 16,000 tonnes should be reviewed.

21. Another group of Parties is of the view that any amendments to the existing rules for LULUCF project activities under the CDM have to be considered in the context of the overall CDM review, the LULUCF accounting rules, the Warsaw Framework for REDD-plus,[10] and other mitigation-related issues under discussion in the UNFCCC process. In their view, much of the focus during the last few years has been on progressing in mitigation actions on a scale larger than that of individual projects.

22. One Party expressed the view that, except for alternative approaches to addressing the risk of non-permanence, if adopted, any additional LULUCF activities under the CDM should follow the existing modalities and procedures.

Views relating to methodological aspects

23. Two groups of Parties and some of the Parties expressed the view that volume 4[11] of the Intergovernmental Panel on Climate Change (IPCC) *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), the methodologies approved under the CDM[12] and the methodologies approved under voluntary carbon offset schemes should be taken into account in the development of methodologies for possible additional LULUCF activities.

24. Another group of Parties expressed the view that methodologies for possible additional LULUCF activities should be robust and practical and should facilitate engagement of all countries, in particular the least developed countries.

25. One Party was of the view that methodologies could be simplified by developing remote sensing based, site-specific carbon stock indices for estimation of carbon stocks and changes in carbon stocks over time.

26. One IGO and one NGO felt that methodologies developed under the CDM and voluntary carbon offset schemes, and methodological approaches contained in the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, volume 4 of the 2006 IPCC Guidelines, the IPCC *2013 Revised Supplementary Methods and Good Practice*

[8] The CMP has agreed that the modalities and procedures described in the annex to decision 5/CMP.1 and the annex to decision 6/CMP.1 shall apply, mutatis mutandis, to the second commitment period of the Kyoto Protocol (decision 2/CMP.7, annex, paragraph 18).

[9] The modalities and procedures for afforestation and reforestation project activities under the CDM in the first commitment period of the Kyoto Protocol contained in the annex to decision 5/CMP.1 use the definition of "reforestation" contained in the annex to decision 16/CMP.1, which limits reforestation activities to reforestation occurring on those lands that did not contain forest on 31 December 1989.

[10] Decisions 9/CP.19 to 15/CP.19.

[11] Agriculture, Forestry and Other Land Use.

[12] <http://cdm.unfccc.int/methodologies/index.html>.

Guidance arising from the Kyoto Protocol and the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands* could be taken into account while developing methodologies for possible additional LULUCF activities.

B. Options for possible additional land use, land-use change and forestry activities

27. This section explores options for possible additional LULUCF activities and their implications for the validation, monitoring and verification of the project activities under the CDM.

28. Possible additional LULUCF activities and related practices[13] suggested in the submissions from Parties and observer organizations are laid out in the table below.[14]

1. General considerations

29. Most of the LULUCF activities listed in the table below can result in GHG mitigation either through an increase in carbon stocks in carbon pools or through a reduction in GHG emissions by sources.[15]

30. Possible project activities that comprise only practices aimed at achieving reductions in GHG emissions by sources[16] are already eligible under the existing modalities and procedures for the CDM.[17]

31. Possible project activities that comprise practices aimed at achieving reductions in GHG emissions by sources and practices aimed at increasing carbon stocks in carbon pools cannot be credited for net emission reductions achieved under the existing modalities and procedures for afforestation and reforestation project activities. The existing modalities and procedures would have to be revised for such crediting to take place.

2. Implications for validation, verification and monitoring of possible additional land use, land-use change and forestry project activities under the clean development mechanism

32. Validation, verification and monitoring of possible additional LULUCF project activities under the CDM would require that these activities meet the basic requirements contained in the existing modalities and procedures for afforestation and reforestation

[13] The word "practice" is used here in the same sense as in chapter 4 of the IPCC special report titled *Land Use, Land-Use Change and Forestry* (see footnote 31 below) and denotes a specific technology, method, action or operation implemented for achieving carbon mitigation or another objective (e.g. low-till practice, reduced-impact logging).

[14] The mitigation practices in the table below are grouped into the five possible additional LULUCF activities, corresponding to the LULUCF activities under Article 3, paragraph 4, of the Kyoto Protocol as suggested by some Parties and observer organizations. Some of the specific possible additional LULUCF activities mentioned in the submissions (e.g. agroforestry) are included as practices under the specific LULUCF activities in the table.

[15] Reductions in emissions by sources can be potentially achieved through increased energy efficiency or GHG efficiency of processes and operations, for example.

[16] One Party suggested in its submission that silvipastoral systems can generate permanent emission reductions from fertilizer use efficiency, reduced enteric fermentation and efficient waste management, including composting and biogas production. However, crediting of these permanent emission reductions would be possible only if they were produced by a stand-alone project, as opposed to by a component of LULUCF project activities that also aim to increase carbon stocks in carbon pools.

[17] Annex to decision 3/CMP.1 and annex II to decision 4/CMP.1.

project activities, although the detailed methodological requirements could vary depending on the specific features of each LULUCF project activity.

33. In the following description of the implications of possible additional activities, where the existing relevant provisions of the modalities and procedures for afforestation and reforestation project activities are potentially applicable to possible additional LULUCF project activities, this has been stated as the first option. Thereafter, additional options identified with a view to addressing the requirements suggested in the submissions are mentioned.

Activity definition and likely practices under the activity

34. Definitions of forest management, revegetation, cropland management, grazing land management, and wetland drainage and rewetting from the annex to decision 16/CMP.1 and the annex to decision 2/CMP.7 could be applied. Each of these LULUCF activities, possibly with the exception of wetland drainage and rewetting, could comprise a variety of practices, depending on the technology and know-how available and other factors.

Criteria for eligibility of land for additional activities

35. The CDM Executive Board could be requested to elaborate eligibility criteria for land to be subjected to possible additional LULUCF activities, with a view to avoiding perverse incentives and leakage resulting from land-use conversions. Those eligibility criteria could potentially be based on the individual features of specific additional LULUCF activities.

Project boundary

36. The provisions for defining project boundaries contained in the existing modalities and procedures for afforestation and reforestation project activities are potentially applicable to possible additional LULUCF project activities under the CDM.

37. Defining project boundaries could also be done without the spatial delineation of boundaries of individual land parcels.[18] Under this option, a spatially explicit delineation of the outer boundary encompassing all the land parcels or a cluster of land parcels would suffice, as the actual area of land subjected to the project activity could be estimated by applying statistical sampling methods.[19]

Baseline and additionality

38. The provisions for the determination of the baseline and demonstration of additionality contained in the existing modalities and procedures for afforestation and reforestation project activities are potentially applicable to possible additional LULUCF project activities under the CDM.

39. Additional specific options based on the individual features of specific possible additional LULUCF activities could be considered for the determination of the baseline in such activities. Such options could include fixed carbon stock baselines, decreasing carbon stock baselines, increasing carbon stock baselines, or a combination of these options.[20]

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[18] An advantage of this option would be an increase in the cost-effectiveness of project development and monitoring, particularly in project activities where a large number of land parcels constitute the project area (e.g. a cropland management project activity whose project boundary includes a large number of non-contiguous land holdings).

[19] Estimation of land area by sampling methods is described in chapter 5 of the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*.

[20] Such options would address the requirements suggested by Parties in their submissions, such as the robustness of baselines, depending on the individual features of specific LULUCF activities.

Possible additional land use, land-use change and forestry activities under the clean development mechanism and related mitigation practices

Land use, land-use change and forestry activity	*Possible mitigation practices*	
	Increase in carbon stock in carbon pools	*Reduction in greenhouse gas emissions by sources*
Forest management	• Improving stocking density • Increasing tree rotation age • Introducing or improving selection felling systems • Introducing reduced impact logging • Improving management of fire, insects and other disturbances • Increasing efficiency of produce extraction (e.g. charcoal making, fuel wood extraction)	• Increasing energy efficiency of logging operations and other forest management operations • Increasing greenhouse gas efficiency of inputs and their application (e.g. reduced amount of fertilizer, efficient application of fertilizer)
Cropland management	• Introducing or enhancing agroforestry practices • Introducing or increasing proportion of perennial crops • Increasing efficiency of soil tillage management (e.g. introducing reduced till or no-till cultivation)	• Increasing energy efficiency of farm machinery (e.g. tractors, irrigation pumps) • Increasing greenhouse gas efficiency of inputs and their application (e.g. efficient application of fertilizer, manure and irrigation water) • Improving process management to reduce process emissions (e.g. efficient residue and waste management, drainage of rice fields)
Grazing land management	• Introducing or enhancing silvipastoral practices • Increasing efficiency of grazing management (e.g. preventing overgrazing, introducing rotational grazing) • Increasing efficiency of soil tillage management (e.g. introducing reduced till or no-till cultivation)	• Increasing energy efficiency of farm machinery (e.g. tractors, irrigation pumps) • Increasing greenhouse gas efficiency of inputs and their application (e.g. efficient application of fertilizer, manure and irrigation water) • Improving process management to reduce process emissions (e.g. efficient management of manure on pasture land)
Revegetation	• Planting trees and shrubs in unused barren lands, on steep slopes, along river banks • Planting trees and shrubs for watershed protection, habitat restoration, soil reclamation and desertification control • Planting trees and shrubs for creating shelterbelts and windbreaks along roads, canals, railways and other public and private lands • Planting trees in rural and urban settlements (e.g. environmental forestry and urban forestry)	Not applicable
Wetland drainage and rewetting	• Avoiding drainage of wetlands • Avoiding peat extraction • Rewetting drained wetlands • Restoring wetland vegetation to its natural state	Not applicable

Validation and verification

40. The provisions for validation and verification of project activities contained in the existing modalities and procedures for afforestation and reforestation project activities are potentially applicable to possible additional LULUCF project activities under the CDM.

41. Verification of possible additional LULUCF project activities would require the quantification of net anthropogenic GHG removals by sinks and of reductions of GHG emissions by sources that such activities produce. The methodologies already approved by the CDM Executive Board for afforestation and reforestation project activities under the CDM could be potentially revised and applied for the additional activities, particularly in the case of forest management and revegetation project activities. Methodologies for the other additional activities could, where appropriate, draw on the reports and guidelines of the IPCC, including the best practices recommended by the IPCC.

Leakage

42. The provisions related to leakage contained in the existing modalities and procedures for afforestation and reforestation project activities are potentially applicable to possible additional LULUCF project activities under the CDM.

43. The accounting of leakage could also be performed by applying a leakage deduction factor to the estimated emission reduction and removal so as to render the credits robust and conservative,[21] taking into account the individual features of specific additional LULUCF activities.

Crediting and monitoring periods

44. The provisions related to the determination of crediting and monitoring periods contained in the existing modalities and procedures for afforestation and reforestation project activities are potentially applicable to possible additional LULUCF project activities under the CDM.

Addressing the risk of non-permanence

45. The provisions related to addressing the risk of non-permanence contained in the existing modalities and procedures for afforestation and reforestation project activities are potentially applicable to possible additional LULUCF project activities under the CDM.

46. If alternative approaches to addressing the risk of non-permanence are agreed by Parties,[22] the project participants would have the option of selecting one of the available approaches.

Socioeconomic and environmental impacts

47. The provisions related to the analysis, addressing and reporting of socioeconomic and environmental impacts contained in the existing modalities and procedures for afforestation and reforestation project activities are potentially applicable to possible additional LULUCF project activities under the CDM.

48. Additional specific options for the analysis, addressing and reporting of socioeconomic and environmental impacts in possible additional LULUCF activities could include: screening project activities for adverse impacts; incorporating, in project design,

[21] The option of applying a leakage deduction factor was proposed in a submission of a Party. This approach has been implemented in some of the voluntary carbon offset schemes.

[22] Alternative approaches to addressing the risk of non-permanence are discussed in chapter III below.

safeguards against adverse impacts and enforcement of such safeguards; and making the verification and certification of co-benefits a requirement.[23]

III. Options for possible alternative approaches to addressing the risk of non-permanence

A. Summary of the views submitted by Parties and admitted observer organizations on possible alternative approaches to addressing the risk of non-permanence

1. Submissions received

49. Seventeen submissions were received from Parties and groups of Parties on the issue of possible alternative approaches to addressing the risk of non-permanence in LULUCF activities under the CDM. These submissions are available on the UNFCCC website.[24] Three submissions, also available on the UNFCCC website,[25] were received from IGOs and NGOs.

50. In their submissions, four groups of Parties and eight Parties recognized the need for and the importance of including alternative approaches to addressing the risk of non-permanence in LULUCF activities under the CDM.

51. One group of Parties expressed the view that any possible alternative approaches to addressing the risk of non-permanence should improve upon the environmental integrity achieved by the current approach.

52. One IGO recognized the need for and the importance of including alternative approaches to addressing the risk of non-permanence in LULUCF activities under the CDM, whereas three NGOs, in their joint submission, expressed the view that the current LULUCF rules on non-permanence should not be further weakened to facilitate trading of land-based carbon credits.

2. Views expressed by Parties and observer organizations on the need for alternative approaches to addressing the risk of non-permanence

53. Most Parties expressed the view that addressing non-permanence in LULUCF activities under the CDM is vitally important for realizing the mitigation potential of the LULUCF sector. In their view, this potential has been severely underutilized because of the non-permanent credits generated by afforestation and reforestation CDM project activities. They further noted that the non-permanent nature of the credits generated by afforestation and reforestation project activities has resulted in higher transaction costs and a lack of fungibility of these credits with other CDM credits, thus rendering the CDM incentive ineffective in enabling projects in the LULUCF sector. One IGO concurred with these views.

54. One Party is of the opinion that properly designed LULUCF activities are capable of generating permanent carbon abatement, and that the current rules on non-permanence in CDM projects do not capture the complexity of carbon sequestration.

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[23] Such options would address requirements suggested by Parties in their submissions, such as the importance of co-benefits that could potentially result from possible additional LULUCF activities. One group of Parties suggested that benefits to sustainable development from possible additional LULUCF activities must be guaranteed.

[24] <http://unfccc.int/5901.php> and <http://unfccc.int/8017.php>.

[25] <http://unfccc.int/7482.php> and <http://unfccc.int/3714.php>.

55. Another Party expressed the view that with experience gained and lessons learned from the current rules on afforestation and reforestation project activities under the CDM and the emerging alternative approaches to addressing the risk of non-permanence under other regulatory and voluntary carbon offset schemes, it is time to move from temporary to permanent credits for LULUCF activities under the CDM.

56. Three NGOs, in their joint submission, suggested that the concept of permanence as addressed under the CDM should recognize the long timescales involved and the lack of possibility of offsetting fossil fuel emissions through land-based carbon sequestration.

3. Suggested possible alternative approaches to addressing the risk of non-permanence

57. Most Parties proposed the option of creating a permanence buffer of credits backed up by host Party guarantee. Under this option, a percentage of certified emission reductions (CERs) to be issued in favour of a LULUCF project activity is set aside into a permanence buffer at the time of issuance. In the event of a future reversal of certified removals resulting from a cause beyond the control of the project participants, an equivalent number of credits from the permanence buffer are used to compensate the reversals.

58. Several Parties proposed including the option of insurance. Under this option the risks of reversal would be underwritten by a third party for a fee to be paid by the project participants.

59. One Party suggested that tonne-year crediting be used. Under this approach, permanent credits would be issued only after fulfilling the permanence requirement of offsetting the global warming potential of a tonne of carbon dioxide.

60. Another Party suggested that the options used by global voluntary carbon markets, including buffer, insurance, country guarantee, buffer backed by insurance, buffer backed by country guarantee, and insurance fund could be considered. In their view, these options could be assessed in comparison with the option of temporary certified emission reductions (tCERs) and long-term certified emission reductions (lCERs), and host Parties could be allowed to choose an option based on their specific national circumstances.

61. One IGO proposed the following alternative approaches: categorical exclusion by classifying certain projects as low-risk and therefore capable of generating permanent credits; the tonne-year approach; use of a permanence buffer of pooled credits; use of commercial insurance; a combination of these approaches, such as the combination of buffer and country guarantee agreed for addressing reversals in carbon dioxide capture and storage (CCS) projects under the CDM.[26]

4. Views on requirements for alternative approaches to addressing the risk of non-permanence

62. One group of Parties and some of the Parties expressed the view that alternative approaches to addressing the risk of non-permanence in LULUCF project activities under the CDM should ensure that reversals of sequestration are monitored and accounted for, and that the risks of reversal are reduced.

63. Most Parties and groups of Parties are of the view that the host Party and the project participants should be allowed to choose from several options one that is best-suited to the national circumstances of the host Party and the circumstances of the project activity.

64. One Party expressed the opinion that modalities and procedures for addressing non-permanence in CDM projects should be integrated into the design of the project. The host Party could indicate in the letter of approval whether it would accept the responsibility for

[26] Annex to decision 10/CMP.7.

possible future reversal of sequestered carbon or would prefer to proceed under the existing temporary crediting arrangements. In the case of opting for permanent credits, the host Party would declare that it accepts responsibility for any reversal that goes beyond the capacity of the permanence buffer and for any intentional reversal of credited removals.

65. Another Party felt that the risk of unintentional loss of carbon caused by a force majeure may be tackled by applying a concept similar to that of carbon-equivalent forest referred to in decision 2/CMP.7, annex, paragraph 37.[27]

66. One group of Parties expressed the view that any proposals on possible alternative ways to address non-permanence should be able to secure the integrity of the CDM, promote mitigation in the land-use sector in a sustainable manner, avoid creating a system that transfers obligations into the future and avoid negative impacts on or interferences with the performance of REDD-plus actions.

67. One IGO was of the view that from the perspective of project participants, a flexible system allowing choice among approaches could be advantageous, whereas from the perspective of a regulatory agency, clear guidelines would need to be developed to ensure that the approaches are verifiable, are able to ensure the environmental integrity of projects and are practicable.

B. Options for alternative approaches to addressing the risk of non-permanence

68. This section explores the options for possible alternative approaches to addressing the risk of non-permanence in LULUCF activities and their implications for the validation, monitoring and verification of the project activities under the CDM. The options are based on the information contained in the submissions of Parties and observer organizations.[28]

1. General considerations

69. This subsection provides the conceptual framework within which the possible alternative approaches to addressing the risk of non-permanence in LULUCF project activities could be described.

Non-permanence and reversal

70. Non-permanence of LULUCF credits results from the risk of reversal of certified GHG removals achieved by LULUCF project activities. Reversal of removals occurs when the carbon stocks accumulated and certified under a LULUCF project activity are released back into the atmosphere.[29] The causes of reversal can be common natural hazards (unintentional reversal) or a decision of the project participants (intentional reversal).

71. Not all fluctuations in carbon stocks within the boundary of a LULUCF project activity lead to a reversal of removals. Fluctuations in carbon stocks due to natural hazards (e.g. fire, pests) or management actions (e.g. thinning, selective logging) that do not decrease the carbon stocks below the minimum level required by the issued CERs would not qualify as reversals.

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[27] The exact term used in decision 2/CMP.7, annex, paragraph 37(c), is "equivalent carbon stock". It refers to the idea that newly established forest should at least match the carbon stock of the harvested forest plantation.

[28] While the options for alternative approaches to addressing the risk of non-permanence described in this section were suggested in submissions from Parties, the details of the options are largely based on the information contained in the submission from an IGO.

[29] The term "reversal" used here carries the same meaning as in decision 5/CMP.1, annex, paragraph 36(b)(ii).

Permanence period

72. A basic question involved in determining the requirements for permanence of LULUCF credits is how long the carbon sequestered by a LULUCF project activity should reside in the carbon pools in order to provide the same climate change mitigation service[30] as the service provided by an emission reduction of one tonne of carbon dioxide equivalent achieved at the same point in time as the sequestration. The IPCC, when discussing this issue, quotes various sources providing time periods ranging from 42 years to 150 years[31] as the duration of storage of carbon in carbon pools that would qualify the removals as permanent. This time period is called the "permanence period" in this technical paper.

73. The following information could be potentially relevant when considering a possible permanence period for removals achieved under LULUCF project activities:

(a) **Atmospheric science basis**. In principle, a one-tonne emission reduction achieved remains in effect forever,[32] that is, it has an infinitely long time horizon. Following this logic, the removals achieved under a LULUCF project activity would need to be maintained forever to qualify as permanent removals;

(b) **Policy relevance**. All climate action, as well as the climate change negotiation process, is underpinned by time-based policy objectives and goals.[33] The CMP decided that the global warming potentials of GHGs used for the second commitment period of the Kyoto Protocol will be based on the effects of GHGs over a 100-year time horizon,[34] even though some of the GHGs emitted into the atmosphere will reside in the atmosphere much longer and will continue to produce radiative forcing. In terms of policy relevance, therefore, the equivalence of mitigation service produced by avoided emissions and achieved by removals could be considered with a finite time horizon in mind;

(c) **Practice and precedent**. Regulatory and voluntary carbon offset schemes other than the CDM have adopted different permanence periods for removals achieved through LULUCF project activities;[35]

(d) **Analogy with the CCS**. The modalities and procedures agreed for CCS project activities under the CDM provide for a minimum monitoring period of 20 years after the end of the last crediting period.[36] Carbon stored in geological formations is expected to become chemically stable over time and hence progressively less susceptible to re-emission. Some fractions of the carbon stored in ecosystems also tend to be stable over time (e.g. carbon in soil), while other fractions (e.g. carbon in above-ground biomass) tend to be susceptible to re-emission. Socioeconomic factors (e.g. economically or legally locked-in land use) can in the long term act as safeguards against re-emission of carbon stored in ecosystems.

[30] "Climate change mitigation service" could be interpreted in terms of its economic value (e.g. economic loss avoided) or in terms of the atmospheric value (e.g. amount of radiative forcing avoided). Both interpretations could be relevant from a policy objective perspective.

[31] Watson RT, Noble IR, Bolin B, Ravindranath NH, Verardo DJ and Dokken DJ (eds.). 2000. *Land Use, Land-Use Change and Forestry. A Special Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.

[32] Unless it causes extra emissions at a later time.

[33] That is, GHG mitigation is not a perpetual goal but a goal to be achieved in finite time.

[34] Decision 4/CMP.7, paragraph 5.

[35] The California Cap-and-Trade Program, the Australian Carbon Farming Initiative and the Verified Carbon Standard have adopted a permanence period of 100 years, whereas the American Carbon Registry has adopted a minimum project term of 40 years.

[36] Decision 10/CMP.7, annex, appendix B, paragraph 16(c).

2. Specific options for alternative approaches to addressing the risk of non-permanence based on submissions from Parties and observer organizations

(a) Permanence buffer backed up by host Party guarantee

Description of the option

74. Under this option, a percentage of CERs to be issued to a LULUCF project activity is set aside into a permanence buffer of credits at the time of issuance.[37] In the event of a reversal of certified removals resulting from a cause beyond the control of the project participants, an equivalent number of CERs from the permanence buffer are used to replace the CERs affected by the reversal.[38]

75. The host Party or an entity designated by it, or the buyer Party (included in Annex I to the Convention) or an entity designated by it could assume the liability for intentional reversals and the portion of unintentional reversals exceeding the capacity of the permanence buffer.

76. The percentage of credits to be set aside by a project activity into the permanence buffer would be determined on the basis of the risk rating of the project activity.[39] This percentage could be either fixed ex ante at the time of registration of the project activity, or assessed ex post at the time of verification, as the risk profile of the project activity could change over time. The capacity of the permanence buffer to absorb reversal risks – its resilience – would depend on the number of project activities subscribing to the buffer and the percentage of credits required to be set aside by the subscribing project activities.

77. The credits accumulated in the permanence buffer could be retained permanently, or they could be returned to the project participants once all the credits issued to a project activity have fulfilled the permanence requirement. Retaining credits would increase the resilience of the permanence buffer. Another option could be to return the credits to those project activities that did not experience reversals and did not have recourse to the permanence buffer. This option would incentivize good risk management by project participants.

Accounting of reversals

78. The permanence buffer option could potentially account for the reversal of certified removals provided that the resilience and viability of the permanence buffer is maintained. Although the credits contributed to the buffer would be of different vintages and would themselves be subject to fulfilling the permanence requirement, the final effect of the chain of exchanges of credits and reversals would be that of permanence.

79. Reversals that exceed the capacity of the permanence buffer and reversals caused by intentional acts of project participants would have to be compensated by the host Party or

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[37] The buffer could be created at the individual project level, or at a regional, national or global level. The option described in this technical paper refers to a global buffer of pooled credits, as such a buffer is likely to have more resilience and capacity to absorb risks. Similar considerations would apply in the case of a project-level buffer, except that a project-level buffer would only be able to absorb smaller risks, since risk coverage would not be spread over different projects. On the other hand, spreading of risk over different projects in the case of a global buffer of pooled credits could result in less incentive for project participants to safeguard against the risks of reversal.

[38] The CERs from the permanence buffer would act as proxy for the CERs whose certified removals have been reversed until the reversed removals have been recovered. Upon recovery of the reversed removals, the buffer CERs would get repatriated into the permanence buffer and become available again for potential reversals in other project activities.

[39] One sub-option within this option would be to fix a threshold risk for exempting project activities from the requirement of setting aside a percentage of credits into a permanence buffer ('categorical exclusion' option).

an entity designated by it, or the buyer Party (included in Annex I to the Convention) or an entity designated by it, as agreed.

Liability

80. Under this option the liability of reversals would be shared among multiple project participants subscribing to the permanence buffer. Project participants would continue to be liable for the monitoring of reversals and the notification of the reversals.

81. Where intentional acts by project participants lead to reversals (e.g. abandoning commitment to the project activity), or where reversals exceed the capacity of the permanence buffer, the host Party or an entity designated by it, or the buyer Party (included in Annex I to the Convention) or an entity designated by it, as agreed, would take on the liability for such reversals.

Implications for validation, monitoring and verification of project activities

82. The implications for the validation, monitoring and verification of LULUCF project activities selecting the permanence buffer option as an alternative approach to addressing the risk of non-permanence could be as follows:

(a) Validation of a project activity would include assessment and confirmation of the risk rating of the proposed project activities;

(b) Verification of a project activity would include confirmation that a minimum amount of carbon stocks were present in the carbon pools of the project activity throughout the verification period and not just at the time of verification. A reassessment of the risk rating of the project activity could be required at the time of verification;

(c) After the first verification and certification, monitoring reports would need to be prepared at fixed intervals regardless of whether project participants wish to request further issuance or not and until the certified carbon stocks have resided in carbon pools for a period equal to the permanence period. Monitoring and notification of reversals would have to be reported immediately rather than at the end of the verification period.

(b) Tonne-year-based crediting

Description of the option

83. Under this option, credits are issued after permanence is achieved, based on the mathematical product of tonnes of carbon dioxide equivalent and years of residence of the carbon in the carbon pools. Thus if a constant (or minimum) carbon stock of x tonnes of carbon dioxide equivalent is maintained in the carbon pools of a project activity for a period of y years, after y years, xy/T permanent credits are issued to the project activity, where T is the permanence period.[40]

Accounting of reversals

84. Under this option credits are issued after permanence is achieved and therefore no reversal can occur.

[40] In practice the numerator could be equal to the integral of the product of carbon stock and time, since the carbon stock in carbon pools would change with time until it reaches a saturation value. The option described here is based on the simplified approach of linear (proportionate) tonne-year crediting. If the non-linear approach based on the decay profile of carbon dioxide in the atmosphere were adopted, the allocation of intermediate credits would vary over time. By the end of the permanence period, however, the total credits generated by the project activity would be the same for both approaches.

Liability

85. Under this option, there is no need to allocate liability for ensuring the presence of carbon in the carbon pools after the credits have been issued.

Implications for validation, monitoring and verification of project activities

86. The implications for the validation, monitoring and verification of LULUCF project activities selecting the option of tonne-year-based crediting as an alternative approach to addressing the risk of non-permanence could be as follows:

(a) Validation of the project activity would be covered by the existing modalities and procedures for afforestation and reforestation project activities, except for the approach selected for addressing the risk of non-permanence;

(b) Verification of a project activity would possibly be conducted over a longer period of time, as more credits would be generated in the later stages of the project activity. Credits would continue to be generated even after the carbon stocks in carbon pools have reached a steady state of saturation;

(c) After verification and certification of carbon stocks, continued periodic monitoring of certified carbon stocks would not be required.

(c) Insurance

87. Under this option, project participants would buy insurance from a third party against potential reversal of credited removals. The third party insurer would be accredited by the CDM Executive Board. The insurer would provide a guarantee to the Board on behalf of the project participants to compensate for any reversals of certified carbon removals. Viability of such insurance would depend upon factors such as the number of subscribers to the insurance scheme, the geographical diversification of project activities (for risk diversification), and the insurability in terms of the potential size of losses, the ability to quantify the risk of such losses, and the corresponding risk premiums that would be built into the insurance costs.[41]

88. Other aspects of reversal accounting for this option would be similar to those for the permanence buffer option.

(d) Menu of options

89. The existence of multiple options, including a combination of the options specified above, for addressing non-permanence of LULUCF credits under the CDM would allow project participants to select the option that would best suit the needs and circumstances of their project activity.

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[41] Similar insurance mechanisms have been explored by the CDM Executive Board regarding ways to address significant deficiencies in validation, verification and certification reports.